

THE
HUNTERIAN ORATION

DELIVERED AT THE ROYAL COLLEGE OF SURGEONS
OF ENGLAND

February 14th, 1887

BY

WILLIAM S. SAVORY, F.R.S.

PRESIDENT OF THE COLLEGE

SURGEON TO ST. BARTHOLOMEW'S HOSPITAL.



London

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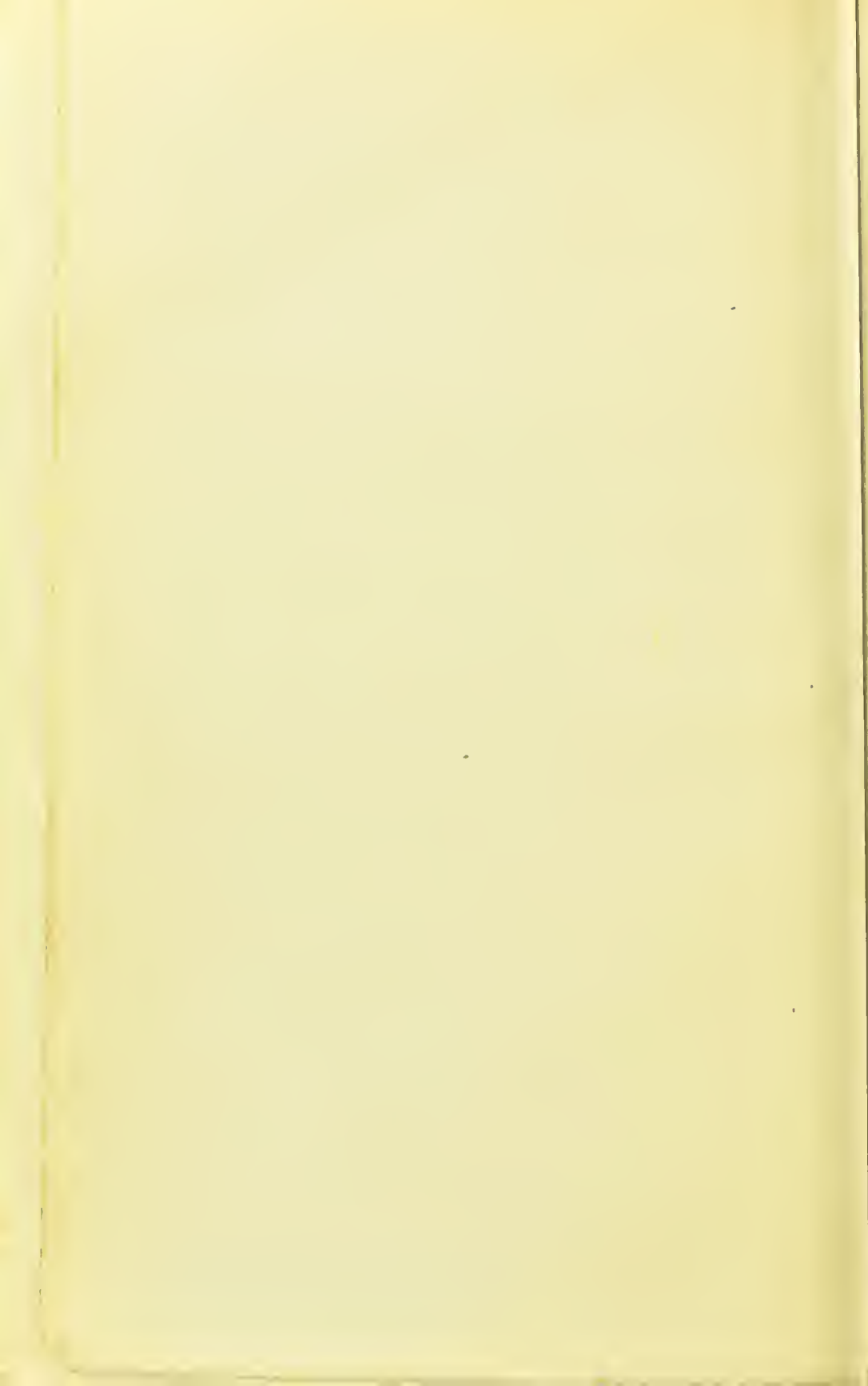
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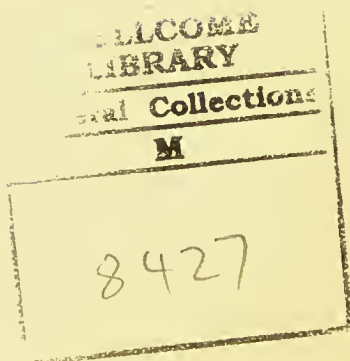
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BZP (Hunter)



THE HUNTERIAN ORATION.



NO word of defence can be needful for the form in which English surgeons have chosen to celebrate the memory of Hunter; but an apology may be offered by one who now attempts the task of speaking of him. The duty of reviewing in this place the life and work of Hunter has been so often and so ably performed, that it seems to me I can do little else than incur failure by any effort to tread in such familiar footsteps. But although tempted, as I may have been, by this and other reasons, to turn aside into some less known path, yet a natural sense of loyalty to the great surgeon and of responsibility to the trust I have accepted has constrained me, and so Hunter in his work must be again the subject of what is called with oppressive grandeur, the Hunterian Oration.

Surgeons with one voice have proclaimed the supremacy of Hunter above all who have ever studied surgery. Students of science have acknowledged him to be among the chief of those who have in any age advanced human knowledge. Yet, although his claims have been often examined, and many students and surgeons have been

engaged in the task, his greatest to the high place he holds is not always recognized, perhaps not even always understood.

May I stand excused then for asking once more and attempting to answer the question—What has Hunter done?

It has been well said that when we attempt to estimate the achievements of the foremost men of past ages, too often we see them only in eclipse. A large part—it may be much the larger part—of what they did is too often hidden from us. The proportion of sudden, or what may now appear as sudden discoveries, may be seen though from afar; they may still strike us even from a distance. But we can now no longer adequately appreciate the conditions under which the pioneers of knowledge laboured. In the light of the present day it is difficult to realize the darkness of past times, or to measure fairly the part they played in dispelling it. We may diligently trace the course they took, and become familiar with every step of it, and yet fail to understand that they not only trod, but actually made the way.

But was Hunter a great discoverer—I mean in the ordinary sense of the word? For we speak of discoveries in science, sometimes forgetting that all real progress involves discovery. What are the particular discoveries then, or improvements in the art of surgery, which are now recalled by the mention of his name? We quote at once, as an instance, the operation for aneurysm, known to all as the Hunterian, and then—we pause. What else shall be declared upon which his fame particularly rests?

Any one, indeed, who has but a passing acquaintance with the works of Hunter can speedily furnish a long list of important papers in which many new and valuable facts

are revealed, and knowledge largely increased, not only in anatomy and physiology, but in pathology and surgery. More than one or two of these would alone suffice to establish the author's claim to ability and industry of no common order ; but in none of them can be pointed out, I think, any particular discovery in surgery from the loss of which Hunter's fame as a surgeon would materially suffer.

But let us go farther. As a surgeon was Hunter pre-eminently skilful in practice? Was he, beyond all other surgeons of his time, sagacious in diagnosis, or successful in treatment? Was he even dexterous in operation? I do not know where to find the evidence upon which these questions can be answered in the affirmative ; indeed, on the latter point there is evidence to the contrary.

Or, once more, was he a learned man in his profession as the phrase is commonly understood? Was he, as we say, a "well-read" man? Was he fully informed of the labours of others? I fear it must be admitted that the testimony in favour of this belief is very slender too.

The introduction of the operation for aneurysm which bears his name was indeed a great step onward. In taking it he gave ample proof of rare foresight, which could proceed only from sound apprehension of some important facts in pathology and surgery, and a masterly grasp of some of the leading truths of physiology. Yet we bear witness to Hunter's fame when we acknowledge that even this grand discovery, among the chief in surgery, adds comparatively little to it.

What more, then, did Hunter achieve? What was he, therefore? Wherein consists his greatness?

He was, and is, beyond and above all surgeons, a philosopher in surgery. His idea of the subject of his thoughts was far more adequate than that of other men.

He was supreme in the scope and method of his work. He understood much better than those around him how to engage in the interpretation of Nature ; he knew best how to approach and to disclose Truth.

For he not only understood that the problems which lay immediately before him were, of all, the most complex and difficult to solve, but he could see also that they were not isolated, but dependent ones. He saw in the necessary relation in which they stood to others the only means by which they could be worked out ; and on this understanding he resolved to investigate the questions he desired to answer.

But consider for a moment what, with the light in which Hunter then stood, that resolution involved. Remember how often, in more recent times, have able men doubted the doctrine, hesitated to accept the idea of that intimate relationship between the various forms of life—of their continuity, of that harmony of plan, of that unity of design, which Hunter not only clearly conceived, but so accepted as a vital truth that he made it the foundation of all his labours ; and after all, the only sure test of genuine and thorough belief is the work which comes out of it. This was the principle on which Hunter never wavered ; it was the star that guided him—without haste, without rest—through all the work of his life.

And observe, I pray you, further, how Hunter proceeded in his work, for this is eminently characteristic of the man. He is not fond of starting propositions, which are then supported by arguments and made plain by illustrations ; but his practice is to demonstrate in their order, without comment or dissertation, the facts which reveal knowledge. His habit appears to be, not to say to us, I am convinced of this, and I will tell you why there can be no doubt about it, but rather to place the premises before us—

sometimes, it may be, with indifference, certainly without regard to effect, or any attempt at direction. His purpose appears to have been uniformly not to support a conclusion, but rather to make way for one.

This, I think, is inscribed on the proudest monument of his genius—his Museum. May I ask you, only for a few moments, to look once more at it?

The passion of Hunter for collecting is well known; it has often been the subject of comment. His Museum included, not only, to use the words of Professor Flower, “illustrations of life in all its aspects, in health and in disease; specimens of botany, zoology, palæontology, anatomy, physiology, and every branch of pathology; preparations made according to all the methods then known; stuffed birds, mammals, and reptiles; fossils, dried shells, corals, insects, and plants; bones and articulated skeletons; injected, dried, and varnished vascular preparations; dried preparations of hollow viscera; mercurial injections, dried and in spirit; vermilion injections; dissected preparations in spirit of both vegetable and animal structures, natural and morbid; undissected animals in spirit, showing external form or waiting leisure for examination; calculi and various animal concretions; even a collection of microscopic objects,” but it extended to “minerals, coins, pictures, ancient coats of mail, weapons of various dates and nations, and other so-called ‘articles of vertu.’” Yet I do not doubt that, notwithstanding the apparently miscellaneous character of a great part of his Museum, this vast collection was very far from being what could be called an empirical one. Save in material, it had not much in common, as some would suggest, with an old curiosity shop. For myself, I believe that even the objects found there, which appear most

foreign to the subject of his thoughts and work, were not introduced from mere idle fancy; but for the purpose, either at once clearly or dimly seen, or, if otherwise, at least conceived possible, of throwing light, in some way, upon the great questions of which his mind was full. I submit that this view is worthier than the prevailing one of the character of Hunter; and it is fortified by evidence of the strongest kind. Look at that section of his Museum which, as Professor Flower truly says, is most characteristic of the man—that which is called, and I venture still to think, well called, the physiological. Had it been somewhat more fragmentary than it was when he left it, had not a fuller light been thrown on the truth it illustrates by the masterly labours of Von Baer, the brilliant exposition of Milne Edwards, and the thoughtful volumes of Carpenter, how much longer would the great idea that governs this unrivalled series have remained concealed? Nay, even still, how often in the comments made on it, is this idea unheeded or overlooked? It is a magnificent collection of comparative anatomy, or, as we may speak now, of morphology. It sets forth the variations in form which the different organs undergo in different species, or in the same species under different conditions. But, above all, it introduces us, in the happiest way, to the study of comparative physiology. It demonstrates the great law of progress from the general to the special; the law of evolution from the simple to the complex; the principle of elaboration and advancement of function by division of labour. Or, again, as Professor Flower admirably puts it—and need I apologize for quoting him here in reference to the Museum?—it throws “light upon one of the great biological problems, classification; which, when rightly interpreted, means

nothing more or less than a statement of the order in which living beings have been evolved from one another." I know not, indeed, whether Hunter ever formulated this idea. He has not laid down the law in explicit terms. I can find no distinct expression of it in any sentence he has written which has reached us. But, then, hasty generalization was no habit of his mind. I do not doubt that, in some large degree, he grasped it; and had he lived on, as the truth became established, he would have made it plain to all. When his labour ceased, he was working out the great idea. But by such glimpses as we thus obtain of the character of his mind and the method of his enquiry; of the way of his genius to begin the search for the truths he sought at the furthest outposts, and from thence, so to speak, to work inward and upward—I cannot regard the possession of any facts or illustrations, which he was enabled to collect, but had not time to place, as wanton or purposeless, or even merely curious. To me, it is wonderful; but withal most suggestive, that the great mind of Hunter was not only far in advance of his own age, but is hardly overtaken by this.

The same method of work is plain in Hunter's labours in surgery. He was ever searching for principles, but strove to reach them only through facts. Facts always first; but never facts only. From facts to principles. He understood that all progress mainly depends on the power of grouping and uniting for some new purpose, facts that have been discovered independently and that are daily being revealed, yet with little or no reference to the principles they are found to support.

And here, again, after a careful examination of Hunter's work in surgery, it is necessary to pause and review it in relation to the knowledge of his time. Then I think

we are impressed, not so much by the actual advance he made in the art, as by the degree in which, through the character of his work, he raised surgery to the level of a science. I would almost venture to say that he effected more by the nature of the questions which he set than by the answers which he worked out. Surely his conception of surgery, of its possibilities in the future, of its relation to the sciences, of the plan—the only sure one—upon which it could be advanced, went very far beyond that of any surgeon before him—shall I say has gone far beyond that of most surgeons after him? But if he could thus estimate the task before him, what shall we say or think of Hunter as we watch him, with unexampled diligence and patience, pondering over the preface? Never turning a page of the great book of Nature, which he had set himself to read, until each sentence before him had been duly weighed, and all that he could learn from it had been secured. But this was not enough. He not only saw that surgery, to be soundly established, must rest upon pathology, but that the language of pathology required an interpreter; that its problems could be solved only by the light of physiology. Where in any work before his—nay, where in any since—shall we find such a union of physiology and surgery? In the pages of Hunter, but there I think only, are they found, as they should be, literally woven into one. We study his chapters on the Blood, on Inflammation, and on Gunshot Wounds, and acknowledge that nowhere else are the principles of pathology so supported and illustrated by the facts and truths of physiology. Yes; as no one before him had given proof of so clear and ample a conception of the relation of surgery to natural science, so in no one since has it borne such fruit. Hunter not only saw more fully than anyone who preceded him the way in which the

art of surgery, through a knowledge of physiology, could be advanced, but he possessed the happy power of working to far better purpose upon this understanding than any of his successors. Nay, more. The same power of mind which gave him a larger grasp of surgery, raised him to a loftier view of the science on which it is founded. He knew better than other men in what direction to look, and when he turned his eyes thither he could see farther.

So now, as we stand upon higher ground on this side of it, we can discern, I think, the idea which pervaded Hunter's work. He saw that surgery, in his time, was but a rude empirical art consisting of little else than a knowledge of many facts which stood in no visible relation to each other, and of many more opinions which, for the most part, had no relation, or but a very distant one, to any facts whatever. That surgery should be raised from a collection of such creeds to the rank of a science; but this could be only by founding its practice upon sound principles. The discovery of some at least of these principles was Hunter's final aim. But these principles could not be reached by guessing; they could be approached only through the orderly investigation of facts. But then an explanation of these facts themselves could be only through the truths of physiology. The signs of disease could be understood only by him who had studied the laws of life and health. An intelligent interpretation of the one could be only in proportion to a previous knowledge of the other. But the problems of life and health are presented to us in man in their most complex form—in a form so difficult, that even Hunter could not solve it. They must be reduced to simpler terms through a study of the lower forms of life. Thus, with the ultimate aim of relieving

human suffering, Hunter studied the phenomena of motion in plants. Nay, he went farther—to crystals and other forms of inorganic matter—and he says: “The better to understand animal matter, it is necessary to understand the properties of common matter, in order to see how far these properties are introduced into the vegetable and animal operations.” Note the characteristic thought at the end of the sentence. He does not start with a denial or an assumption, but he is anxious to “see how far.”

And if it must be said that in his attempt to grapple with the crucial problem of life Hunter failed, it must be acknowledged that he failed only in the task where none have hitherto succeeded. And the weakness he exhibits here appears chiefly in the fact that he encountered this, the greatest of all questions before him, not always according to his wont, by careful, patient, and impartial investigation of the facts which lead up to it. But it must be confessed that the dominant idea of a living or vital principle was too ready to do duty for causes that were to him then, as they are to us now, obscure. Yet, even here, where Hunter is tried by the severest of all tests, one cannot but observe in what favourable contrast he stands to others who have attempted to solve the problem; how determined he is, for instance, to depend for the most part on experiment, and how comparatively trivial has been the advance in actual knowledge of the subject since his time. Recently we have learnt, indeed, to recognize more fully the play in the living body of the common forces or forms of force of nature; and hence we have been led to suppose that the forces peculiarly vital may hold the same relation to them as they do to each other; that all the distinctive phenomena of vital action may depend on the transformation of force with which else-

where we have become in effect more or less familiar. But beyond this attempt to see, as Hunter put it, how far the common forces of nature are concerned in the phenomena of life and the reasonable conjecture that has hence arisen of the relation of the vital within us, to the forces around us, how much farther have we gone?

Yes; Hunter stood before the crowning mystery of life, and could not raise the veil. But, then, to whom amongst the sons of men has it been yet given to draw it aside? Let the darkness which, after another century of thought and work, still enshrouds the subject be the comment on Hunter's reflections on the nature of life.

Now perhaps the question may be worth asking, How far is it practicable, in the present day, to turn to good account the priceless legacy which Hunter has left us in the record of the plan on which he studied surgery? How far is it possible to follow now, at however great a distance, the example which he set?

Or, to put it thus. Supposing Hunter to have lived in our day, could the range of his work have been still as ample? How much of what he did depended, for its scope, on himself; how much on the scanty state of knowledge of his time?

If Hunter lived amongst us now, his grasp of natural science and of surgery would, of course, be very different from what it was in the last century. It is common to remark that knowledge in this, as in other directions, has increased so largely that the relation in which any man can stand to the whole of it must be very different now from what it was a hundred years ago.

As knowledge advances, and the sum of it accumulates, the share which any one man can appropriate must of necessity gradually grow less, and become a smaller fraction

of the whole. There can be no help for this or remedy, save in a corresponding advance in the development of the human mind. What reflection is more familiar to us than that on the progress of knowledge? But is the power of apprehending it greater now than it was in the days of Plato or Aristotle? This must mean that, as the world goes on, the attainments of even the foremost in intellectual power must become more partial. Who now would dare to talk of taking all knowledge for his province? It involves the fact of greater individual incompleteness. In the old days, the best men could be more on a level with the knowledge of their time. Thence every year onward places even these farther below it, and the great law of division of labour prevails.

Yet for this there is a gracious law of compensation. For while, on the one hand, there is now so much more to be seen, on the other, the master minds of previous ages have made it much easier for us to see. For by the establishment of principles, the outcome of their labours, we are raised, as it were, upon the shoulders of our ancestors, and the horizon of our vision is more comprehensive than theirs.

For as facts accumulate and principles become moulded out of them, not only does the apprehension of these principles enable us, except for special purposes, to dispense with many facts, but such expansions of knowledge have a value far beyond this. Principles are the means by which important facts are fixed and registered. They are means by which our knowledge of the facts they embrace is secured and made available for the future. Disconnected, isolated facts—facts which are not orderly arranged and assimilated into principles, are in constant danger of dying out. Very grievously, I imagine

has the practice of medicine and surgery suffered from this loss. It is painful to think of the multitude of facts which must have been known to the older physicians and surgeons that either have been, or are being, from time to time, mislaid by us. Many of these, no doubt, in the course of knowledge, have become worthless, being superseded by others, but many too had probably a value that now we can neither appreciate nor understand.

Let us look at this matter more closely in its relation to surgery. What place should physiology, for instance, occupy in the study of surgery? I am not speaking now of physiology as a chief instrument of education (a very different matter), but I ask what share it should receive of the time and attention of the student of surgery?

Some knowledge of physiology is essential to the surgeon. This statement, I suppose, will be generally accepted. At all events, those who may think otherwise will hardly care to say so in good company. But then how much of physiology is needful for the surgeon? What parts of it may safely be left alone? I would answer shortly, that the principles of physiology should be thoroughly understood by the surgeon, and with these, perhaps, what may be called the leading facts.

For instance, with reference to the circulation, it seems to me that every surgeon should understand the function and mode of action of the heart, arteries, veins, and capillaries; but I do not think that every surgeon need be able throughout his life to state the facts and observations upon which the conclusions are based. I think he should understand the meaning of the capillary circulation, and its relation to the other parts of the circulatory system, and the conditions by which the pressure of the blood is regulated; but I should not

think it necessary for him to be able always to follow the impressive series of facts through the vegetable and animal kingdoms upon which these conclusions are founded. Thus he takes advantage of great principles which have been established on a multitude of facts, and, by intelligent study of a few weeks, he may be spared many months of what might, perchance, prove to him tedious detail.

So with respiration. He should understand, I think, not only the mechanism of the process in man, but the principle on which a respiratory organ is constructed; which are the essential and which the accessory parts. But he need not be called upon to remember always the various forms of the respiratory apparatus in the animal kingdom.

So with digestion. He should, I think, understand what is known of the functions of different portions of the alimentary canal, and of the organs accessory to it; but he need not be able to recognize at a glance through the microscope a particular section of every part of it.

Now assuming, as we have done, that some knowledge of physiology is necessary to the surgeon in ordinary, have his labours in this science, if properly directed, been extended, do you imagine, by its advance? I should say, on the contrary, that they have not only been reduced and shorn of many difficulties, but that, if only his studies be conducted with moderate judgment, he can now acquire much more than formerly upon far easier terms.

If any doubt exist in the mind of any one of what has thus come of the enunciation of principles, or of what I would call leading facts in physiology, let him look over the history of our knowledge of the great subject of development. Of what a mass of hard, dry, almost unin-

telligible statements it formerly consisted. Now, I do not mean to say that our present knowledge of this subject is free from all intricacy; but as much that was mysterious and doubtful has become clear and plain, I appeal to all who have studied it whether the task has not only been made far more agreeable and profitable, but whether it is not now easier to get it all "up," as the phrase is, in a shorter period of time?

And farther, this applies not only to the surgeon properly so-called, not alone to one who studies physiology only as a means to an end, but it applies also to those who would study physiology, as Hunter did, with the pure view of its advance. That which occupied Hunter years to unravel may now be gathered up in a few days, and from the point so readily reached, the work may still be carried on. The field of labour, the ground which has to be upturned is, happily, now no longer the same; but what change is called for in the method of work? what improvement can be suggested of the plan which Hunter pursued?

Now, while for the scientific surgeon a knowledge of the principles and leading facts of physiology will suffice, for the practice of surgery a knowledge is required not only of the principles of surgery, but of as many facts as possible and of detail of every kind. But, although in the practice of surgery, acquaintance with every fact and familiarity with every detail is of importance, inasmuch as it may be useful in some degree in promoting recovery or alleviating distress, yet in surgery as in physiology and other sciences, and for the same reason, a knowledge of principles must be always paramount, and it is only by their discovery and establishment that its advance will be secured.

Principles are in the practice of surgery what grammar

is to language. Men may talk without grammar, speak even good English without knowledge of grammar, and men may practise surgery with little or no knowledge of its principles, just as a mariner may sail in familiar waters without compass or quadrant. But what if strange difficulties should arise?—and is it unusual in surgery to encounter them? What when we pass, as often we are driven, from the well-worn track of every-day experience?

Surely, the great lesson which Hunter taught and teaches, the example he set in the study of surgery was never more needful than it is now, when every year the strain in this direction becomes more urgent. I think, from the time of Hunter to the present, we can trace his influence upon the scientific study of surgery through a long line of distinguished men; but the improvement of surgery as an art is not altogether favourable to the progress of surgery as a science. For as the art of surgery advances, and skilful management of detail involves more and more of every surgeon's care and time, the study of principles is in danger of being neglected. There may be less of science because there is more of art. And then the art of surgery is—apparently, at least—the more immediately important. Its application to practice is more obvious and, to the general view, more useful. Above all, it leads to an end by a shorter path and easier steps. To study surgery as a science, and to master its principles, makes a far larger demand on the intellect, and involves higher and rarer qualities than to acquire technical skill in the form, not only of mere manual dexterity, but also in that of familiarity with routine. In a word, the knowledge of the art of surgery means far less expenditure of that which most men are most loth to yield than a study of the science, and secures always a more immediate and usually, in one sense, a more

substantial return. Hence, it is popular, and is likely to become still more so. This may be, from a certain point of view—which is not the finest—of temporary advantage to particular surgeons, but, in the highest sense, it is bad for surgery.

Moreover, the truth is, that science is never able to accomplish much when held in bondage by the immediate wants of life. Its investigations are successful only when they are pursued with indifference to the uses to which they may be applied.

This suggests, then, a question for the future, the answer to which seems to be hardly an encouraging one. As in each successive year facts and details in every direction—all of more or less immediate importance in the practice of surgery—accumulate, less and less time and attention are likely to be spared for the study and apprehension of its principles, to say nothing of the neglect of the sciences upon which these principles are founded. Is not surgery itself, then, as a science, it may be asked once more, in danger from the extension of surgery as an art? I can imagine there are some who will admit that this is so with very sinister complacency. But what would Hunter have said to it? And, unfortunately, in the present tendency of affairs, what he does say and teach is likely to become unheeded, for it can hardly be expected that the study of his works will survive the decline of scientific education.

The law of division of labour is oftentimes appealed to in this matter, but I venture to think this is not, or at least ought not to be, a case in point. It is often said that as surgery advances, and the art grows more extensive, it becomes more impracticable for any one to entertain the whole of it. Thus then, first of all, the study of surgery as a science must be set aside by practical men, and then the art must in turn be broken up, the several portions of it

being assigned to different practitioners. Now with regard to what is called specialism, let me say at once that I have no word to utter in disparagement of that form of it which consists in a man, first of all, studying and duly qualifying himself in the principles and practice of surgery as a whole, and then, at length, devoting his attention more especially to the cultivation of some particular department of it. This is not the form of specialism against which I would protest. In my humble opinion, it is in no way an unworthy one, and if it were, it is by no means frequent. It is no illustration of the law of division of labour, as commonly understood, for excellence is not here obtained solely by exclusiveness. But the kind of specialism which should be denounced, and which it is to be feared is not very rare, is that which consists in the practice of some particular portion of surgery without adequate attainment in, or continued study of, surgery as a whole. This is a form of exclusiveness detrimental, I think, to the progress of surgery, and, therefore, to our profession, both from a scientific and social point of view, and to the public. This I take to be a false application of the law of division of labour, which in manufacture and in many branches of skilled labour is so advantageous, and even inevitable, for ease, rapidity, and cheapness of production; and by which every day human hands are being superseded by machinery. The law of division of labour is, indeed, generally recognized and very useful here, but it is not known, and has no place, in the noblest science or in the highest art.

While, then, we contemplate the genius of Hunter in his works, he has left us an example which is not altogether out of our reach, in his conception of the subject, and his idea of the plan of studying it. His view of surgery was more comprehensive, far worthier than that of others. Had he

lived with us, would his views, do you suppose, have become narrower, would they have been less remote from specialism? Is it now no longer practicable to study surgery as Hunter studied it?

Aye; but to study surgery as Hunter studied it means more than this. For he was great, not only in his understanding, in his apprehension of the nature of the task which lay before him, or in his appreciation of the difficulties of research, but he was great in the spirit with which he encountered them. His patience in ascertaining facts, in investigating questions of every kind, seems to have been well-nigh inexhaustible. It was certainly no habit of his mind to take anything for granted, or, when he could help it, to accept any statement at second-hand. And this was the more remarkable in a man whose mind was ever on the alert for the larger truths beyond to which facts are but the stepping stones.

For the titles of his various papers very often convey no adequate notion of their contents. He writes on some fact in natural history which is carefully and accurately described. But very soon it is used in illustration of some principle which is forthwith expounded, or in evidence of some original view which is then set forth, or in suggestion of some further research. Thus the fact, of which only the title speaks, becomes the text of a very valuable discourse.

Yet Hunter was also remarkable in this, that the ideas which constantly occupied his mind and on which he was always at work still left him with the keenest eye for every novelty which his labours incidentally disclosed, although it lay altogether outside the current of his thoughts. Thus, in addition to the progress he made in the main subject of his labours he was always accumulating

a multitude of what, for the time being, were isolated facts. In this way he must have added largely to his wealth of knowledge.

If there is any point clear in the character of Hunter's work it is that it was real, genuine, thorough. It may be said, indeed, that this must be true of all good work ; but not, I think, in the degree in which it is obvious in his. He is never content with a cursory glance or a superficial view. Even when questions arise in the course of some inquiry which, so far as that end is concerned, may be lightly disposed of, Hunter almost invariably dwells on them, sometimes at such length and so exclusively, as to suggest that he has forgotten the purpose on which he set out. But it is evident that he could not bear to go on his way passing by so much that was undone. This gives a singular character to many of his papers. Much of the apparent want of skill in arrangement and exposition, and the seemingly purposeless way in which oftentimes statements of facts are scattered through his writings, is, I think, due to embarrassment from the riches he had gathered.

And the singleness of purpose with which he worked is made evident, not only in the actual result of his labours, for no human being with divided interests could rival such achievements ; but in the record, as we have it, of the life he led. He gave not only the whole of his time—yes, the whole of it in no mere conventional sense—and all his great powers, his mind and body alike, to the one object of his life ; but to this he sacrificed all that he possessed, all that he could gain. To this he devoted, without stint or scruple, his money, his friendships, all his other interests. What any other man would have considered impossible he made practicable. And

this to no personal end. Careless of all reward save that which was to him paramount—the discovery of truth.

A noteworthy point in the character of Hunter appears to me to be found in the relation which, in him, thought bore to action. He combined in himself, in a very eminent, I had almost said in a singular degree, the power of conception and of execution. He not only saw much farther, but he was able to do much more than most others. He saw, as Bacon saw, and the idea was probably as original with him as with Bacon, that the systematic and thorough examination of facts was the first thing to be done in science, "and that till this had been done faithfully and impartially, with all the appliances and all the safeguards that experience and forethought could suggest, all generalizations, all anticipations from mere reasoning must be adjourned and postponed; and further, that sought on these conditions, knowledge, certain and fruitful, beyond all that men then imagined, could be obtained." But he went immeasurably farther than the great prophet of science in putting his conception to the proof in imperishable work on the lines he had laid down. "I only sound the clarion," said Bacon proudly, "but I enter not into the battle." Hunter sounded a clarion the echoes of which are reverberating still, but he entered into the battle also, was always found where the blows fell thickest, and we are in possession of the spoils. In his Museum there is, at once, the clearest evidence of the idea and the richest fruits of execution.

Bacon, we know, has been compared to Moses on Pisgah surveying the promised land, and Newton to Joshua, who began to take possession of it. But Hunter saw the Canaan of surgery, and took possession of it too.

The mode in which Hunter conducted his investiga-

tions in physiology and surgery reminds one of the scientific work of an engineer in laying siege to some fortress. He begins by examining in every way he can the character of the defences ; he studies, by every means in his power, its strength of resistance ; he measures, to the best of his ability, the difficulties before him. Then, when all this is done, and in nowise previously, he draws out deliberately the plan of attack ; arranges the whole scheme of action, and works steadily, patiently, and persistently upon the lines so laid down. It may seem to those who look on in ignorance, that time and force are wasted in such elaborate care and toil. But all this means that each step forward shall be well assured, and that there shall be no risk of having to fall back. Ever ready to take advantage of surprises, or of dashing assaults, he does not reckon upon these, or allow any part of his design to be made dependent on their success. He goes in to win, not by chance, but by method, and the flag of his country at length floats upon the battlements, not as the trophy of the courage of a forlorn hope, but in triumph of scientific forethought and calculation.

The study of Hunter in his work is instructive, in view not only of what he was, but also of what he was not. What Hunter's acquirements were when he commenced the study of anatomy is not quite clear, and cannot be determined with precision now : but this, at least, may be considered certain—that he could not, at that time, have been called a man of good general education ; and it appears certain also that never, at any subsequent period of his career, could he have devoted any care or time to attainments in literature. One result of this defect in him is evident, not only in the absence, in all he wrote, of that which is termed

style, but even in the want of power of lucid expression. He cannot always say clearly what he means. His thoughts are too frequently involved in obscurity and confusion.

Very much has been said and written on the rival claims and opposing merits of science and literature, but surely to very little purpose. To compare or contrast the advantages of literature and science—to discuss their relative value even as instruments of education—appears to me to be as futile as to consider the relative advantages, or proportionate value, of the forces of nature. Each has its place, its power, and its claims. Each by itself is incomplete, defective. But they are in their purpose correlative, each supplying that which the other lacks, and together, but together only, making the circle of knowledge and education complete. When the champion of science thinks lightly of attainments in literature, or the master of letters speaks with disdain of scientific knowledge, each, I take it, shows only that he cannot appreciate what he does not understand. It is, perhaps, the most conspicuous instance of the evil of that one-sidedness which springs from the inevitable division of labour; of the want of sympathy, which is too common in distinguished men with any kind of work outside their own. It is, indeed, natural and necessary that men should become chiefly interested in that which is the daily occupation of their life, that they should prefer, before every other, their own pursuit. But it is unfortunate that we should grow so indifferent, as we commonly do, to the claims of branches of knowledge that we do not possess; and it is still worse if, instead of devoting any spare time at our command to their study, we employ it in denouncing the effort, or in expressing contempt for them. In the example of Hunter,

one passes over with impatience the numerous disquisitions in which attempts have been made to prove the enormous advantage that Hunter derived from want of education ; how much less a man he would have been had he learnt more in his boyhood. No doubt very much depends on the nature of the subjects taught, and still more on the method of instruction. But I confess that to me it seems the education, of whatever kind, must indeed be a very bad one, which is not better than none at all. My conviction is that if Hunter had received a good general education in early years, he would have been all the better for it. He would have lost nothing. His mental powers could have been in no way impaired, but on the contrary, enhanced. He would have recorded the result of his labours in better order, with more light and greater effect ; and we should have had the advantage of a clearer revelation of his thoughts.

But all this is very far from saying that Hunter was not, in the strictest sense, an educated man. He was not, indeed, a scholar. If the subtle rendering of a Greek poet or the skilful turning of Latin verse be the sole test of culture, he gave no sign of it. Of ancient lore he was sadly destitute. *In literis humanioribus* he could have had no place. But if a transcendent knowledge of nature and her ways, if a firm and ample grasp of her noblest truths, be accounted education ; if the devotion through a lifetime of gigantic intellectual powers and of a true and loving heart to the reverent study of God's works be culture, then Hunter, though not a man of letters, was surely a highly educated man.

I do not think that we can now obtain a closer view of the character of Hunter and of his habit of work than that which is afforded by his letters to Jenner. How

entirely destitute they are of any trace of literary skill. Even after some correction, how clumsily and awkwardly they are for the most part expressed; evidently not a passing thought bestowed on their composition. But how they always struggle, often how straight they go, to the point. Always full of the subject of his work, they must thoroughly reflect the disposition of his mind at the time he wrote them. Careless of all form, and of everything else, save to get out of Jenner some information he wanted; now seeking directly for some knowledge which he believed Jenner to possess; now suggesting some inquiry that Jenner might make for him; sometimes plainly dictating the method of it; then begging boldly for some animal or other specimen which he coveted; occasionally only a word of persuasion or encouragement, or even an attempt at bribery, lest Jenner should grow weary of well-doing. All outside matters, whether public or private or domestic, ignored except at rare intervals, when it is comical to see, as anyone may easily, that a sense of unbecoming neglect of these small ceremonies strikes him, and then we are surprised by some polite sentence in conclusion. Once, indeed, there is an attempt to console Jenner for some disappointment in love by the assurance "I shall employ you with hedgehogs." But the whole correspondence tells a simple tale of indefatigable industry, of unquenchable energy, of singleness of purpose, and unbounded sacrifice; of determination, heedless of cost and difficulty, and all else, to seize every possible opportunity of accumulating knowledge.

The fame of Hunter, after all, falls far short of him. It may, without exaggeration, be said that he is really greater than to most men, even to most surgeons, he appears to be. And the reason of this is not far to seek. Neither the

genius nor the labour of Hunter is of a kind that at once strikes the inquirer, or can be readily understood by the student. He made no startling discovery, in the popular acceptation of the term, which can be discerned at a glance and appreciated by everyone. As we follow, one after another, the successive, or oftentimes, as they really were, the simultaneous works of Hunter, we may remark the absence of any apparently great intellectual feats; we are never dazzled by the brilliancy of particular achievements. We may, indeed, say of very much of what he did that it might have been produced by any very intelligent, thoughtful, and industrious man devoted to his subject. With regard to separate portions of it, we can very rarely go beyond this, and exclaim, as a famous author tells us that he did, as he threw down his pen over one of his own passages, "By Jove, that is a stroke of real genius." In this respect, Hunter will not compare favourably with some far below him in scientific rank. His work, in order to be fully appreciated, must be studied throughout. It is not, of course, of uniform excellence; but Hunter's fame does not rest altogether on any particular part; indeed it may be said that any particular part might be withdrawn without any material loss to our estimate of his power. We might select examples of it to illustrate his ability in this or that direction, as, for instance, his skill in inquiry, to his researches on the increase of temperature in inflammation, and his experiments on the transplantation of the cockspur, and on the growth of bones; his sagacity, to his inference, from the character of their contractility, that the arteries are muscular; the soundness of his judgment, to his reflections on the coagulation of the blood. But I venture to think that no separate fraction of his work will enable us to grasp his conception of the

plan on which surgery should be studied, or the progress which, in a few short years, he actually made in its execution. It is only after a review of the whole of his vast labours, in their mutual relation—not merely after a study of the merits of his numerous papers, each taken by itself—but in an attempt to apprehend the scheme to which, as it appears to me, all his labours were subservient, that we are, in any measure, able to realize the strength of Hunter's genius.

Then as the chief merit of his work is not of a character to catch at once the eye, even of one who searches for it, so his subject is not one of widespread or popular interest. I can well imagine that, of all men who have achieved greatness, Hunter requires to be studied with most diligence. The more so because of the absence of all literary skill. And there can be no doubt that he shared the fate of all those who have been, like him, in advance of their time. He was so far beyond his contemporaries as to be, for the most part, out of their reach, and therefore they left him alone. And even his successors have not always found him out. It may indeed be said to have been almost by an accident that, in association with the possession of his Museum, we have periodically a festival in honour of his memory. Yet, even with all this, how much time is devoted at the present day to the study of his works? Nay, dare I ask the further question here, Can every one of us who call ourselves surgeons say that he has read them?

Such then, at least in the eyes of one who, though from afar, has long and earnestly looked up to him, was John Hunter. Beyond all cavil, if the word have any meaning for us, a man of genius; a man supremely endowed with power and faculties for the discovery of truth. With little

education at the outset of life, without the advantage of the schools, he found himself face to face with the deepest and most mysterious problems of Nature. And he was forthwith able to take full measure of the magnitude of the task. It seems never to have occurred to him that he could snatch an answer by surprise ; that a solution could be reached by any short or sudden means. But his survey assured him that upon one plan only, but by that abundantly, could success be made certain. So with patience, which of itself has been called genius, he went back to the beginning. It was genius, too, and that of the highest order, to discern at so vast a distance, where the beginning lay. But there he placed himself, and from that point went forward only when he had made each footstep sure. Who shall say that his imagination was not fertile or that he faltered in the use of it ? Yet no seductive theory tempted him into undue haste ; and though sometimes drawn aside by a specious speculation, he seems hardly ever to have been lost in an unsound conclusion. And when he felt the treasures he had won were found not only in the multitude of facts he had garnered, or even in the principles, which by virtue of the facts he had discovered, were made plain ; but also in the very plan and purpose of his work. For, from the height on which at length he stood, not only can the path he trod be clearly traced, but the highway thenceforward is disclosed. So is the greatness of John Hunter to be estimated not only by what he discovered, but rather by the lesson and example of his work. Truly it may be said of him that he did much. Truly it may be said of him that he showed how much more is to be done.

“ He, being dead, yet speaketh ”—still speaks to us as no other man before or since has spoken. But when and

where can his voice be heard most plainly? Are the spirits of those who have shaken off "this muddy vesture of decay" permitted to revisit the scenes of their earthly labours? Can they still be with us on our way? If the soul of this mighty son of science is ever in our midst, surely his favourite haunt must be now within these walls—in the Museum which will soon almost surround us—at once his most graphic and glorious monument. The memory of Hunter, like the memory of the greatest men of every age, is imperishably enshrined. Art, in her noblest efforts, has striven to make his form familiar to us. His name is stamped in indelible characters on the records of human progress. But, before all, he lives in and draws the breath of life from his own immortal works; and of these, none can be so truly a memorial of the very man as this; no other can so resemble him, can possess so much of him, can tell so fully of what he was; can so perpetuate him in the vast store of facts, in the purpose for which they are set forth, in the illustration of principles, in the suggestion of truths beyond those it can show, above those it can reach; in all this, I say, no memorial, however majestic, can rival our Museum. The foundation of this with his own hand and his whole heart he laid; it has grown and still is growing from his strength, and it must be made for ever worthy of his name.











